

Abstract of the Disclosure

A shut-off type diaphragm valve adapted for use in an atomic layer deposition system includes a valve seat having an annular seating surface that surrounds an inlet of the valve and extends radially therefrom. The seating surface contacts a substantial portion of the first side of a flexible diaphragm when the diaphragm is closed, to facilitate heat transfer and counteract dissipative cooling of the diaphragm, thereby inhibiting condensation of a medium flowing through the valve passage. The seating surface is preferably flat and smooth, to prevent shearing of an elastomeric diaphragm. For a plastic diaphragm, a ring-shaped seating ridge may extend from the seating surface to cause localized permanent deformation of the diaphragm and enhanced sealing, while still allowing a substantial portion of the diaphragm to contact the seating surface for enhanced heat transfer. Valve speed enhancements and other reliability enhancing features are also described.